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AIR FORCE BALLISTIC MISSILE DIVISION
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AIR RESEARCH AND DEVELOPMENT COMMAND
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MILITARY SATELLITE PROGRAMS PROGRESS REPORT
Month Ending 31 July 1960
DD-DR&E (M) 397

FOREWORD

Attached are the reports covering progress during the month of July 1960 for the DISCOVERER, SAMOS and MIDAS Programs. These reports are directed by Secretary of Defense memorandum to the Secretary of the Air Force, dated 27 February 1960.

Harry L. Evans
for O. J. RITLAND
Major General, USAF
Commander

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DISCOVERER PROGRAM

1. This report, covering progress during the month of July 1960, is submitted in accordance with Department of Defense memorandum to the Secretary of the Air Force, dated 27 February 1960.

2. FLIGHT TEST STATUS

a. DISCOVERER XIII Flight

The launch of DISCOVERER XIII is scheduled for 10 August.

b. DISCOVERER XIII Diagnostic Payload

DISCOVERER XIII will carry a diagnostic payload in addition to the normal recovery equipment. This payload contains instrumentation to determine capsule environment and the functioning of separation and recovery sequence events. A five-channel telemetry system is installed to transmit this data. To assure receipt of all data, a tape recorder is provided to record the real time events and capsule performance during the telemetry "blackout" period which occurs when the capsule re-enters the atmosphere. After a two-minute time delay, this stored data will be transmitted. The high speed of re-entry induces ionization over the skin of the capsule which effectively blocks telemetry transmission. An S-band transponder is also provided to aid in tracking this capsule from ejection through recovery.

3. TECHNICAL STATUS

a. RF Interference Test Program

The cause of improper horizon scanner operation was determined to be RF interference from the satellite telemetry transmitter. A modification has been incorporated to correct this condition. Subsequent testing has revealed no RF interference with the scanner at any frequency or transmitter power level.

b. Second Stage Vehicles

Three AGENA "B" vehicles (XLR-81Ba-7 engines) are now in storage following Air Force acceptance. These vehicles will be moved to the Vandenberg Air Force Base missile assembly building as required for launch. The first two AGENA "B" vehicles using the XLR-81Ba-9 engine are undergoing hot firing acceptance tests at Santa Cruz Test Base.

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c. Recovery System Component Test Program

The third and fourth successful balloon drops of the recovery system series were made at Holloman Air Force Base on 23 and 27 July. The retro rocket and spin/de-spin systems functioned satisfactorily. These were the second and third successful dynamic tests of the "cold gas" spin system. In both tests chaff was dispensed from the pilot chute deployment bag and did not contact the main chute, indicating that the prior interference problem has been solved.

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SAMOS PROGRAM

1. This report, covering progress during the month of July 1960, is submitted in accordance with Department of Defense memorandum to the Secretary of the Air Force, dated 27 February 1960. The first three SAMOS flights are programmed to carry a dual payload including both visual and ferret reconnaissance system packages. Future flights will carry a single photo or ferret payload. Payloads are being developed to attain progressively higher levels of performance, as follows:

a. Visual Reconnaissance Systems

Readout:

E-1 Component Test Payloads.

E-2 Steerable Reconnaissance Payloads (with 20-foot ground resolution).

Recoverable:

E-5 High Resolution, Steerable, Recoverable Payload (with 5-foot ground resolution).

E-6 General Area Coverage, Recoverable Payload (with at least 20-foot ground resolution).

b. Ferret Reconnaissance Systems

F-1 Component Test Payloads.

F-2 Digital General Coverage Payloads.

F-3 Specific Mission Payloads - Analog Presentation.

2. TECHNICAL STATUS

a. Second Stage Vehicles

(1) The AGENA vehicle for the first SAMOS flight was delivered to Vandenberg Air Force Base following successful captive hot firing tests and completion of dynamic systems testing at Santa Cruz Test Base. The vehicle is proceeding on schedule through modification and subsystem bench testing in the missile assembly building. Although impeded by parts shortages and the recent strike, schedules are being maintained to assure transfer of the vehicle to the launch pad by 10 August.

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(2) The AGENA vehicles for the second and third flights are currently in the modification and subsystem test phases at the systems test area. Both vehicles are behind schedule because of the recent one-month strike, and parts shortages. Efforts to recover current schedules are dependent upon continued availability of air-borne communications equipment. The second flight vehicle is short the UHF narrow-band and wide-band data link transmitters. A firm delivery date is not available from the narrow-band transmitter contractor; however, a backup flight unit was received on 25 July. Delivery of a wide-band transmitter to replace the one used in the first flight vehicle has been made. The third flight vehicle has eight major air-borne communications equipment shortages. Since delivery of these units is not expected before mid-August, it is extremely doubtful that the schedule can be recovered.

(3) The first AGENA "B" vehicle is in the major subassembly phase of manufacture. Assembly was delayed by the recent strike, but every effort is being made to regain the schedule.

b. Visual Reconnaissance Systems

(1) Readout:

(a) Checkout and testing of the E-1 payload are progressing satisfactorily at Vandenberg Air Force Base.

(b) Initial E-2 payload component testing and assembly is progressing satisfactorily at Eastman Kodak. All components for the first flight payload (to be carried on the fourth SAMOS flight) are assembled and component qualification tests are underway prior to final payload assembly. Environmental tests of the thermal mockup in the high altitude temperature simulator indicate that successful environmental control of critical components can be achieved under both hot and cold orbital conditions.

(2) Recoverable:

Development of the E-5 recovery payload continues on schedule. [illegible] single large parachute and a cluster of three smaller parachutes to determine the most suitable configuration for capsule final descent. Tests to determine capsule drag and oscillation characteristics during retrieval into a recovery aircraft have started at Edwards Air Force Base.

c. Ferret Reconnaissance Systems

The F-1 payload, previously deleted from the first SAMOS flight, was reinstated on 26 July. Checkout and testing of the payload has been accelerated at Vandenberg Air Force Base.

d. Ground Support Equipment

(1) Delivery of major items of ground equipment to Vandenberg Air Force Base in support of the initial SAMOS flights is now complete. The electronics package for the visual reconnaissance payload vacuum test chamber was shipped to the missile assembly building on 20 July.

(2) Deliveries of the E-1 and F-1 operating consoles, the second set of E-1/E-2 visual reconnaissance ground reconstruction electronics equipment, and two primary record cameras to the Vandenberg Air Force Base data acquisition and processing building were completed during the report period.

(3) Installation of the UHF equipment required for intial SAMOS operations at the Vandenberg Air Force Base tracking and acquisition station is complete, and the equipment is now undergoing systems integration. Also completed at this station was the installation of the Model 1604 computer, both sets of the E-1/E-2 visual reconnaissance ground reconstruction electronics equipment, and the E-1 operating console.

(4) Assembly and checkout of the Programmable Integrated Control Equipment (PICE), to be available for the third and subsequent SAMOS flights, are progressing on schedule at the contractors facility. Functional checkout and compatibility tests of set No. 1 are now in progress. Delivery to the Vandenberg Air Force Base tracking and acquisition station is scheduled for September 1960. Set No. 2, scheduled for delivery to the Satellite Test Center sixty days after completion of Set No. 1, is in final assembly.

e. Facilities

(1) [illegible] required for the first SAMOS flight [illegible] equipment

are progressing at a rate compatible with the scheduled launch date. Systems testing of the Pad 1 complex at Point Arguello was completed late in July.

(2) Bid opening for the Point Arguello diesel generator building was held on 26 July. A total of twelve bids ranging from $184,000 to $249,000 were received.

(3) The SAMOS laboratory building at Vandenberg Air Force Base was completed and accepted on 18 July, with minor deficiencies remaining to be corrected. Design of the Vandenberg Air Force Base helium unloading and storage facility has been initiated with design completion scheduled in early October.

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MIDAS PROGRAM

1. This report, covering progress during the month of July 1960, is submitted in accordance with Department of Defense memorandum to the Secretary of the Air Force, dated 27 February 1960.

2. FLIGHT TEST STATUS

The Air Force Ballistic Missiles Committee has authorized two MIDAS flights, designated RM-1 and RM-2. These flights will be launched from Vandenberg Air Force Base between October and December. The flights will be THOR-boosted and will use AGENA "B" vehicles currently in the DISCOVERER Program. A background radiometer will be carried rather than an infrared missile detection payload. These flights will provide infrared background measurements for a wide variety of conditions, as may exist between arctic and tropical regions. They will assist in determining the magnitude of background radiance in the 2.7 and 4.3 micron absorption range and in establishing the spatial and spectal background characteristics which must be known for current as well as future MIDAS requirements.

3. TECHNICAL PROGRESS

a. Second Stage Vehicles

(1) Assembly of the AGENA "B" vehicle for the third MIDAS flight is proceeding on schedule. Delivery to the systems test area is scheduled for 3 August. This is the first MIDAS vehicle to have restart capability.

(2) Because of the recent strike at Lockheed, a schedule slippage has been incurred in the fabrication phase of the two subsequent AGENA "B" flight vehicles. The impact of these scheduled slippages is not well defined at this time.

b. Infrared Scanners

Infrared scanner units for flights 3, 4, and 5 are being manufactured by Baird-Atomic, Inc., and for flights 6, 7, and 8 by Aerojet-General Corporation.

(1) [illegible]

(2) Should the results of acceptance testing indicate the desirability of replacing the drive motors or the turret bearing, larger drive motors have been ordered and a new bearing is being designed.

(3) A detailed reliability test program is being developed for the Aerojet-General advanced infrared detection payload configuration. In addition to developing the service test model of this payload, Aerojet is now contracted to procure long leadtime items for the flight payloads. The definitive contract for this payload is expected to be completed in August.

c. Facilities

(1) A government-to-government agreement is being drafted for the United Kingdom station in anticipation of approval of the MIDAS operational program. Facility design criteria applicable to this and other MIDAS readout stations are being prepared.

(2) A site survey team is scheduled to depart for the Union of South Africa during the first week in August to conduct site surveys for the Southeast Africa telemetry station.

(3) Construction of North Pacific station technical facilities at Donnelly Flats, Alaska, is proceeding on schedule. Because of last year's prolonged steel strike and the late thaw this spring, construction of the support facilities at Fort Greely, Alaska, will be delayed approximately two months. Completion is now scheduled for December.

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